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UNIT TERMINAL OBJECTIVE

- 1-1 At the completion of this unit, the EMT-Intermediate student will:
- C understand his or her roles and responsibilities within an EMS system, and how these roles and responsibilities differ from other levels of providers.
 - C understand the role of medical direction in the out-of-hospital environment.
 - C understand and value the importance of personal wellness in EMS and serve as a healthy role model for peers.
 - C be able to identify the importance of primary injury prevention activities as an effective way to reduce death, disabilities and health care costs.
 - C understand the legal issues that impact decisions made in the out-of-hospital environment.
 - C value the role that ethics plays in decision making in the out-of-hospital environment.

COGNITIVE OBJECTIVES

COGNITIVE OBJECTIVES
At the completion of this unit, the EMT-Intermediate student will be able to:

- 1-1.1 Define the following terms: (C-1)
 - a. EMS Systems
 - b. Certification
 - c. Registration
 - d. Profession
 - e. Professionalism
 - f. Health care professional
 - g. Ethics
 - h. Medical direction
 - i. Protocols
- 1-1.2 Describe the attributes of an EMT-Intermediate as a health care professional. (C-1)
- 1-1.3 Explain EMT-Intermediate licensure/ certification, recertification, and reciprocity requirements in his or her state. (C-1)
- 1-1.4 Describe the benefits of EMT-Intermediate continuing education. (C-1)
- 1-1.5 List current state requirements for EMT-Intermediate education in his/ her state. (C-1)
- 1-1.6 Describe examples of professional behaviors in the following areas: integrity, empathy, self-motivation, appearance and personal hygiene, self-confidence, communications, time management, teamwork and diplomacy, respect, patient advocacy, and careful delivery of service. (C-1)
- 1-1.7 Provide examples of activities that constitute appropriate professional behavior for an EMT-Intermediate. (C-2)
- 1-1.8 Describe how professionalism applies to the EMT-Intermediate while on and off duty.
- 1-1.9 List and explain the primary and additional roles and responsibilities of the EMT-Intermediate. (C-2)
- 1-1.10 Describe the importance and benefits of quality EMS research to the future of EMS. (C-3)
- 1-1.11 Describe the role of the EMS physician in providing medical direction. (C-1)
- 1-1.12 Describe the benefits of medical direction, both on-line and off-line. (C-1)
- 1-1.13 Describe the relationship between a physician on the scene, the EMT-Intermediate on the scene, and the EMS physician providing on-line medical direction. (C-1)
- 1-1.14 Describe the components of continuous quality improvement. (C-1)
Explain the components of wellness for the EMS provider. (C-2)
- 1-1.15 Discuss the importance of universal precautions and body substance isolation practices and develop strategies to prevent the transmission of diseases. (C-3)
- 1-1.16 Describe the steps to take for personal protection from airborne and blood borne pathogens. (C-1)
- 1-1.17 Explain what is meant by an exposure and describe principles for management. (C-1)
- 1-1.18 Describe the incidence, morbidity and mortality of preventable injury and illness. (C-1)
- 1-1.19 Identify the human, environmental, and socioeconomic impact of preventable injury and illness. (C-1)

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PSYCHOMOTOR OBJECTIVES

1-1.74 Demonstrate the proper procedures to take for personal protection from disease. (P-2)

DECLARATIVE

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- k. Audit and quality assurance
 - l. Disaster planning
 - m. Mutual aid
 - C. Dynamic process
 - 1. Delineate system-wide problems identified
 - 2. Elaborate on the cause(s) of the problem
 - 3. Aid the problem and develop remedy(ies)
 - 4. Lay out plan to correct the problem
 - 5. Enforce the plan of correction
 - 6. Reexamine the problem
 - D. Appropriate EMS research can help enhance quality improvement efforts
- V. The well-being of the EMT-Intermediate
 - A. Introduction
 - 1. Wellness has three components
 - a. Physical well-being
 - b. Mental well-being
 - c. Emotional well-being
 - 2. Implementing lifestyle changes can enhance personal wellness
 - 3. Enhancing personal wellness can serve as a role model/ coach for others
 - B. Review preventing disease transmission
 - 1. Occupational Safety and Health Administration (OSHA) and Centers for Disease Control and Prevention (CDC) Guidelines for blood borne pathogens
 - 2. Terminology
 - a. Air/ blood borne pathogens
 - b. Exposure
 - (1) Contact with a potentially infectious body fluid substance
 - (2) Contact with other infectious agent
 - c. Cleaning, disinfection, sterilization
 - d. Body substance isolation, universal precautions
 - (1) Practices designed to prevent contact with body substances
 - (2) Practices designed to reduce contact with other agents
 - 3. Common sources of exposure
 - a. Needle stick
 - b. Broken or scraped skin
 - c. Mucous membranes of the eyes, nose or mouth
 - 4. Protection from air/ blood borne pathogens
 - a. Follow engineering and work practices
 - (1) Puncture resistant containers
 - (2) Laundry
 - (3) Labeling
 - b. Maintain good personal health and hygiene habits
 - (1) Hand washing
 - (2) General cleanliness
 - c. Maintain immunizations
 - d. Periodic tuberculosis screening
 - e. Body substance isolation/ universal precautions
 - (1) Gloves
 - (2) Mask, gown, eye wear
 - (3) Other equipment

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- f. Proper disposal of contaminated supplies
 - g. Cleaning and disinfecting of used materials/ equipment
5. Periodic risk assessment
6. Documenting and managing an exposure
 - a. Wash the area of contact thoroughly and immediately
 - b. Document the situation in which the exposure occurred
 - c. Describe actions taken to reduce chances of infection
 - d. Comply with all required reporting responsibilities and time frames
 - e. Cooperate with incident investigation
 - f. Check tuberculosis/ other screening for exposure
 - g. Proper immunization boosters
 - h. Complete medical follow-up

A. Epidemiology

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- (2) Who makes the decision?
- b. Obligation to provide care
 - (1) Good Samaritan
 - (2) Inability to pay
 - (3) Isn't in the "health plan"
 - (4) Patient "dumping"
 - (5) Economic triage
- c. Advocacy
- d. EMT-Intermediate accountability
 - (1) Patient
 - (2) Physician medical director
 - (3) System/ HMO protocols
- e. Role as physician extender
 - (1) The physician orders something which
 - (a) The EMT-Intermediate believes is contraindicated
 - (b) The EMT-Intermediate believes is medically acceptable but not in the patient's best interests
 - (c) The EMT-Intermediate believes is medically acceptable but morally wrong

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- Steering Committee Project, *Consensus Statement on The Role of Emergency Medical Services in Primary Injury Prevention*, 1993, NHTSA/ MCHB/ NAEMSP.
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- Menegazzi, J. J. (1993). *Research: The Who, What, Why, When, and How*. Ferno-Washington, Inc.
- Centers for Disease Control, 1991
- Consensus Statement on the role of Emergency Medical Services in Primary Injury Prevention, February 1996

- 1-2.41 Name the parts of the cardiac conduction pathway. (C-1)
- 1-2.42 Explain the relationship between stroke volume, heart rate, and cardiac output. (C-1)
- 1-2.43 Explain how the nervous system regulates heart rate and force of contraction. (C-1)
- 1-2.44 Describe the structure of arteries and veins, and relate their structure to function. (C-1)
- 1-2.45 Describe the structure of capillaries, and explain the exchange processes that take place in capillaries. (C-1)
- 1-2.46 Describe the pathway and purpose of pulmonary circulation. (C-1)
- 1-2.47 Describe the pathway and purpose of systemic circulation. (C-1)
- 1-2.48 Define blood pressure. (C-1)
- 1-2.49 Explain the factors that maintain and regulate blood pressure. (C-1)
- 1-2.50 Describe the functions of the lymphatic system. (C-1)
- 1-2.51 Describe the immune response. (C-1)
- 1-2.52 State the function of the respiratory system. (C-1)
- 1-2.53 Describe the structure and functions of the components of the respiratory system. (C-1)
- 1-2.54 Describe normal inhalation and exhalation. (C-1)
- 1-2.55 Differentiate between ventilation and respiration. (C-1)
- 1-2.56 Explain the diffusion of gases across the alveolar-capillary junction. (C-1)
- 1-2.57 Describe how oxygen and carbon dioxide are transported in the blood. (C-1)
- 1-2.58 Explain the nervous and chemical mechanisms that regulate respiration. (C-1)
- 1-2.59 Describe the functions of the digestive system, and name its major divisions. (C-1)
- 1-2.60 Describe the water compartments and the name for the fluid in each. (C-1)
- 1-2.61 Explain how water moves between compartments. (C-1)
- 1-2.62 Explain the regulation of the intake and output of water. (C-1)
- 1-2.63 Describe the three buffer systems in body fluids. (C-1)
- 1-2.64 Explain why the respiratory system has an effect on pH, and describe respiratory compensating mechanisms. (C-1)
- 1-2.65 Explain the renal mechanisms for pH regulation of extracellular fluid. (C-1)
- 1-2.66 Describe the effects of acidosis and alkalosis. (C-1)

After the completion of this unit, the EMT-Intermediate student will be able to:

1-2.67 Appreciate how anatomy and physiology are the foundation of medicine. (A-2)

None identified for this unit.

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III. Cells

- #### IV. Tissues

- ## V. Integumentary system

- ## VI. Skeletal system

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VII. The muscular system

- A. Structure
- B. Function
- C. Types
 1. Skeletal
 2. Smooth
 3. Cardiac

A. Function

1. Voluntary activity
2. Involuntary activity
- B. Nervous system divisions
 1. Central nervous system
 2. Peripheral nervous system
- C. Neurons
 1. Structure
 - a. Cell body
 - b. Dendrites
 - c. Axons
 2. Synapses
 - a. Neurotransmitter
 - b. Inactivators
 3. Types of neurons
 - a. Sensory neurons
 - b. Receptors
 - c. Motor neurons
- D. Nerve types
 1. Sensory
 2. Motor
- E. The nerve impulse
 1. Polarization
 2. Depolarization
 3. Repolarization
- F. The central nervous system
 1. The spinal cord
 2. Brain
 - a. Ventricles
 - b. Medulla
 - c. Pons
 - d. Midbrain
 - e. Cerebellum
 - f. Hypothalamus
 - g. Thalamus
 - h. Cerebrum
 - i. Frontal lobes
 - j. Parietal lobes
 - k. Temporal lobes
 - l. Occipital lobes

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XIII. The lymphatic system and immunity

- #### XIV. Respiratory system

- ## XV. The digestive system

- ## XVI. Fluids and electrolytes

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b. Alkalosis

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DECLARATIVE

- I. Names of drugs
 - A. Drugs - chemical agents used in the diagnosis, treatment, or prevention of disease
 - B. Pharmacology - the study of drugs and their actions on the body
 - C. Chemical name - a precise description of the drug's chemical composition and molecular structure
 - D. Generic name or non-proprietary name
 - 1. Official name approved by the FDA
 - 2. Usually suggested by the first manufacturer
 - E. Trade or proprietary name - the brand name registered to a specific manufacturer or owner
 - F. Official name - the name assigned by USP
- II. Sources of drugs
 - A. Plants
 - 1. Alkaloids
 - 2. Glycosides
 - 3. Gums
 - 4. Oils
 - B. Animals and humans
 - C. Minerals or mineral products
 - D. Chemical substances made in the laboratory
- III. Drug classification
 - A. By body system
 - B. Class of agent
 - C. Mechanism of action
- IV. Sources of drug information
 - A. AMA Drug Evaluation
 - B. Physician's Desk Reference (PDR)
 - C. Hospital Formulary (HF)
 - D. Drug inserts
 - E. Other texts, sources
- V. Standardization of drugs
 - A. Standardization is a necessity
 - B. Techniques for measuring a drug's strength and purity
 - 1. Assay
 - 2. Bioassay
 - C. The United States Pharmacopeia (USP)
 - 1. Official volumes of drug standards
 - D. Other reference books and guides
- VI. Special considerations in drug therapy
 - A. Pregnant patients
 - 1. Before using any drug during pregnancy, the expected benefits should be considered

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- against the possible risks to the fetus
- 2. The FDA has established a scale (Categories A, B, C, D, and X) to indicate drugs that may have documented problems in animals and/ or humans during pregnancy
- 3. Many drugs are unknown to cause problems in animals and/ or humans during pregnancy
- 4. Pregnancy causes a number of anatomical and physiological changes
- 5. Drugs may cross the placenta or through lactation
- B. Pediatric patients
 - 1. Based on the child's weight or body surface area
 - 2. Special concerns for neonates
 - 3. Length-based resuscitation tape
- C. Geriatric patients
 - 1. The physiological effects of aging can lead to altered pharmacodynamics and pharmacokinetics

- A. EMT-Intermediates are held responsible for safe and therapeutically effective drug administration
- B. EMT-Intermediates are personally responsible - legally, morally, and ethically - for each drug they administer
- C. EMT-Intermediates
 1. Use correct precautions and techniques
 2. Observe and document the effects of drugs
 3. Keep their knowledge base current to changes and trends in pharmacology
 4. Establish and maintain professional relationships
 5. Understand pharmacology
 6. Perform evaluation to identify drug indications and contraindications
 7. Seek drug reference literature
 8. Take a drug history from their patients including
 - a. Prescribed medications
 - (1) Name
 - (2) Strength
 - (3) Daily dosage
 - b. Over-the-counter medications
 - c. Vitamins
 - d. Drug reactions
 9. Consult with medical direction

- A. Central nervous system
- B. Peripheral nervous system
 - 1. Peripheral nervous system characteristics
- C. Somatic system
- D. Autonomic nervous system (ANS)
 - 1. Autonomic nervous system characteristics
 - a. Parasympathetic and sympathetic characteristics
 - b. Autonomic antagonists

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- c. Physiological antagonism between sympathetic and parasympathetic discharge - organ responses
- E. Sympathetic branch of ANS
- F. Parasympathetic branch of ANS
- G. Direction of sympathetic influences
- H. Altering neurotransmission with drugs
 - 1. Modification of chemical transmission by drugs
- I. Receptor location and selective drug action
 - 1. Autonomic neurotransmitters
 - 2. Acetylcholine (cholinergic) receptor locations
 - 3. Norepinephrine (adrenergic) receptor locations
- J. Biological model systems and receptor characterization
- K. Receptor structure
- L. Synaptic control mechanisms

- A. Drugs do not confer any new functions on a tissue or organ in the body, they only modify existing functions
- B. Drugs in general exert multiple actions rather than a single effect
- C. Drug action results from a physiochemical interaction between the drug and a functionally important molecule in the body
- D. Drugs that interact with a receptor to stimulate a response are known as agonists
- E. Drugs that attach to a receptor but do not stimulate a response are called antagonists
- F. Drugs that interact with a receptor to stimulate a response, but inhibit other responses are called partial agonists
- G. Once administered, drugs go through four stages
 1. Absorption
 2. Distribution
 3. Metabolism
 4. Excretion

- A. Liquid drugs
 1. Solutions
 2. Tinctures
 3. Suspensions
 4. Spirits
 5. Emulsions
 6. Elixirs
 7. Syrups
- B. Solid drug forms
 1. Pills
 2. Powders
 3. Tablets
 4. Suppositories
 5. Capsules
- C. Gas forms

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XI. Overview of the routes of drug administration

- A. The mode of drug administration affects the rate at which onset of action occurs and may affect the therapeutic response that results
- B. The choice of the route of administration is crucial in determining the suitability of a drug
- C. Drugs are given for either their local or systemic effects
- D. The routes of drug administration are categorized as
 - 1. Drugs administered by the inhalation route
 - a. Nebulized medications
 - 2. Enteral (drugs administered along any portion of the gastrointestinal tract)
 - a. Sublingual
 - b. Buccal
 - c. Oral
 - d. Rectal
 - e. Nasogastric
 - 3. Parenteral (any medication route other than the alimentary canal)
 - a. Subcutaneous
 - b. Intramuscular
 - c. Intravenous
 - d. Intrathecal
 - e. Pulmonary
 - f. Intralingual
 - g. Intradermal
 - h. Transdermal
 - i. Umbilical
 - j. Intraosseous
 - k. Nasal
 - 4. Endotracheal

XII. Mechanisms of drug action

- A. To produce optimal desired or therapeutic effects, a drug must reach appropriate concentrations at its site of action
- B. Molecules of the chemical compound must proceed from point of entry into the body to the tissues with which they react
- C. The magnitude of the response depends on the dosage and the time course of the drug in the body
- D. Concentration of the drug at its site of action is influenced by various processes, which are divided into three phases of drug activity
 - 1. Pharmaceutical
 - a. Disintegration of dosage form
 - b. Dissolution of drug
 - 2. Pharmacokinetic
 - a. Absorption
 - b. Distribution
 - c. Metabolism
 - d. Excretion
 - 3. Pharmacodynamic

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a. Drug-receptor interaction

- A. Passive transport
- B. Active transport
- C. Absorption
 - 1. Variables that affect drug absorption
 - a. Nature of the absorbing surface
 - b. Blood flow to the site of administration
 - c. Solubility of the drug
 - d. pH
 - e. Drug concentration
 - f. Dosage form
 - g. Routes of drug administration
 - h. Bioavailability
 - 2. Mechanisms involved in absorption
 - a. Diffusion
 - b. Osmosis
 - c. Filtration
- D. Distribution
 - 1. Drug reservoirs
 - a. Plasma protein binding
 - b. Tissue binding
 - 2. Barriers to drug distribution
 - a. Blood-brain barrier
 - b. Placental barrier
- E. Biotransformation
 - 1. Active metabolites
 - 2. Inactive metabolites
- F. Excretion
 - 1. Organs of excretion
 - a. Kidneys
 - b. Intestine
 - c. Lungs
 - d. Sweat and salivary glands
 - e. Mammary glands

A. Theories of drug action - most drugs produce their effects by one of the following ways

1. Drug-receptor interaction
 - a. Agonists
 - b. Antagonists
 - c. Affinity
 - d. Efficacy
 - e. Types of receptors
 - (1) Beta
 - (2) Alpha

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- (3) Dopaminergic
 - (4) Others
- 2. Nonspecific drug interaction
- B. Drug-response relationship
 - 1. Plasma level profile of a drug
 - 2. Biologic half-life
 - 3. Therapeutic threshold or minimum effective concentration
 - 4. Therapeutic index
- C. Factors altering drug responses
 - 1. Age
 - 2. Body mass
 - 3. Sex
 - 4. Environmental milieu
 - 5. Time of administration
 - 6. Pathologic state
 - 7. Genetic factors
 - 8. Psychologic factors
- D. Predictable responses
 - 1. Desired action
 - 2. Side effects
- E. Iatrogenic responses
- F. Unpredictable adverse responses
 - 1. Drug allergy (medications frequently implicated in allergic reactions)
 - 2. Anaphylactic reaction
 - 3. Delayed reaction ("serum sickness")
 - 4. Hypersensitivity
 - 5. Idiosyncrasy
 - 6. Tolerance
 - 7. Cross tolerance
 - 8. Cumulative effect
 - 9. Drug dependence
 - 10. Drug interaction
 - 11. Drug antagonism
 - 12. Summation (addition or additive effect)
 - 13. Synergism
 - 14. Potentiation
 - 15. Interference

A. Variables influencing drug interaction include

1. Intestinal absorption
2. Competition for plasma protein binding
3. Drug metabolism or biotransformation
4. Action at the receptor site
5. Renal excretion
6. Alteration of electrolyte balance

B. Drug-drug interactions

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- C. Other drug interactions
 - 1. Drug-induced malabsorption of foods and nutrients
 - 2. Food-induced malabsorption of drugs
 - 3. Alteration of enzymes
 - 4. Alcohol consumption
 - 5. Cigarette smoking
 - 6. Food-initiated alteration of drug excretion
 - D. Drug incompatibilities - occur when drugs are mixed before administration
- XVI. Drug storage
- A. Certain precepts should guide the manner in which drugs are secured, stored, distributed, and accounted for
 - B. Refer to local protocol
 - C. Drug potency can be affected by
 - 1. Temperature
 - 2. Light
 - 3. Moisture
 - 4. Shelf life
 - D. Applies also to diluents
- XVII. Security of controlled substances
- A. Procedures and measures to ensure the security of controlled substances
 - B. Local protocols, requirements, and documentation
- XVIII. Components of a drug profile
- A. Drug names
 - B. Classification
 - C. Mechanisms of action
 - D. Indications
 - E. Pharmacokinetics
 - F. Side/ adverse effects
 - G. Routes of administration
 - H. How supplied
 - I. Dosages
 - J. Contraindications
 - K. Considerations for pediatric patients, geriatric patients, pregnant patients, and other special patient groups
 - L. Other profile components
- XIX. Drugs used in pharmacological management plans (drugs appear in generic name)
- A. Acetylsalicylic acid
 - 1. Drug names
 - 2. Classification
 - 3. Mechanism of actions
 - 4. Pharmacokinetics
 - 5. Indications
 - 6. Contraindications

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7. Contraindications
8. Side/ adverse effects
9. Routes of administration
10. How supplied
11. Dosages
12. Special considerations

1. Drug names
2. Classification
3. Mechanism of actions
4. Pharmacokinetics
5. Indications
6. Contraindications
7. Side/ adverse effects
8. Routes of administration
9. How supplied
10. Dosages
11. Special considerations

1. Drug names
2. Classification
3. Mechanism of actions
4. Pharmacokinetics
5. Indications
6. Contraindications
7. Side/ adverse effects
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11. Special considerations

1. Drug names
2. Classification
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4. Pharmacokinetics
5. Indications
6. Contraindications
7. Side/ adverse effects
8. Routes of administration
9. How supplied
10. Dosages
11. Special considerations

1. Drug names
2. Classification
3. Mechanism of actions
4. Pharmacokinetics

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| | 5. | Indications |
| | 6. | Contraindications |
| | 7. | Side/ adverse effects |
| | 8. | Routes of administration |
| | 9. | How supplied |
| | 10. | Dosages |
| | 11. | Special considerations |
| I. | | Furosemide |
| | 1. | Drug names |
| | 2. | Classification |
| | 3. | Mechanism of actions |
| | 4. | Pharmacokinetics |
| | 5. | Indications |
| | 6. | Contraindications |
| | 7. | Side/ adverse effects |
| | 8. | Routes of administration |
| | 9. | How supplied |
| | 10. | Dosages |
| | 11. | Special considerations |
| J. | | Lidocaine HCl 2% |
| | 1. | Drug names |
| | 2. | Classification |
| | 3. | Mechanism of actions |
| | 4. | Pharmacokinetics |
| | 5. | Indications |
| | 6. | Contraindications |
| | 7. | Side/ adverse effects |
| | 8. | Routes of administration |
| | 9. | How supplied |
| | 10. | Dosages |
| | 11. | Special considerations |
| K. | | Morphine sulfate |
| | 1. | Drug names |
| | 2. | Classification |
| | 3. | Mechanism of actions |
| | 4. | Pharmacokinetics |
| | 5. | Indications |
| | 6. | Contraindications |
| | 7. | Side/ adverse effects |
| | 8. | Routes of administration |
| | 9. | How supplied |
| | 10. | Dosages |
| | 11. | Special considerations |
| L. | | Naloxone |
| | 1. | Drug names |
| | 2. | Classification |
| | 3. | Mechanism of actions |

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4. Pharmacokinetics
5. Indications
6. Contraindications
7. Side/ adverse effects
8. Routes of administration
9. How supplied
10. Dosages
11. Special considerations

1. Drug names
2. Classification
3. Mechanism of actions
4. Pharmacokinetics
5. Indications
6. Contraindications
7. Side/ adverse effects
8. Routes of administration
9. How supplied
10. Dosages
11. Special considerations

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- b. Vials
 - c. Prefilled syringes
 - d. Other
 - 6. Intravenous (IV) administration sets
 - a. Various types
 - b. Macrodrop chamber-type
 - c. Microdrop chamber-type
 - d. Variety of extensions and other pieces of equipment
 - e. Some IV administration sets are manufacturer specific
 - 7. Intravenous (IV) solutions
 - a. Types of containers
 - b. Variety of volumes
 - 8. Volume control intravenous set
 - a. Various brands
- D. Preparation of parenteral medication
 - 1. Equipment needed for preparing a parenteral medication
 - 2. Standard procedures for preparing all parenteral medications
 - 3. Guidelines for preparing medications
 - a. Prefilled syringes
 - b. To prepare a medication from an ampule
 - c. Removal of a volume of liquid from a vial
 - d. Preparing a drug from a mix-o-vial
- E. Administration of medication by the subcutaneous route
 - 1. Subcutaneous route - injections are made into the loose connective tissue between the dermis and muscle layer
 - 2. Equipment needed for administration of a medication by the subcutaneous route
 - 3. Locate anatomical sites
 - a. Upper arms
 - b. Anterior thighs
 - c. Abdomen
 - d. Sublingual injection
 - 4. Technique for administration of medication by the subcutaneous route
 - 5. Precautions
- F. Administration of medication by the intramuscular route
 - 1. Intramuscular route - injections are made by penetrating a needle through the dermis and subcutaneous tissue into the muscle layer
 - 2. Equipment needed for administration of a medication by the intramuscular route
 - 3. Locate anatomical sites for adults and children
 - a. Vastus lateralis muscle
 - b. Rectus femoris muscle
 - c. Gluteal area
 - d. Deltoid muscle
 - 4. Technique for administration of medication by the intramuscular route
 - 5. Precautions
- G. Administration of medication by intravenous bolus
 - 1. Intravenous route
 - a. Places the drug directly into the bloodstream
 - b. Bypasses all barriers to drug absorption
 - 2. Drugs are administered by direct injection with a needle and syringe into an established peripheral IV line

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- B. Equipment needed for obtaining a blood sample
 - C. Locations from which to obtain a blood sample
 - 1. Anatomical sites
 - 2. From the established intravenous catheter
 - 3. Other locations
 - D. Steps to preparing equipment for obtaining a blood sample
 - E. Techniques for obtaining a blood sample
 - F. Complications
- XIII. Disposal of contaminated items and sharps
- A. Follow local protocol for disposal of contaminated items and sharps